March 29, 1932. M. F. POWERS 1,851,112

HAND TOOL

Filed Nov. 17, 1930

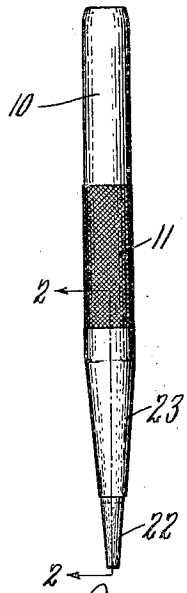


Fig. 1

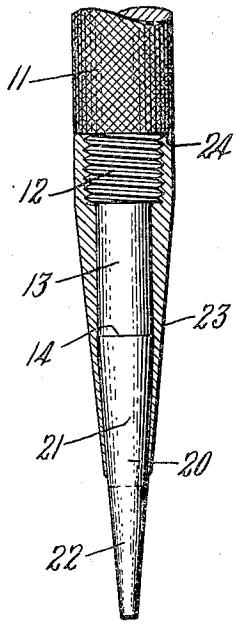


Fig. 2

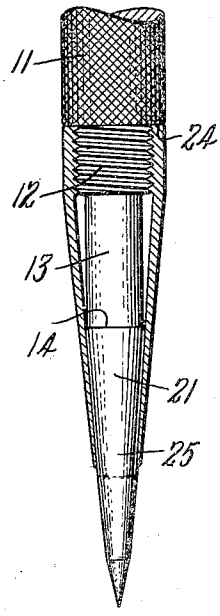


Fig. 3

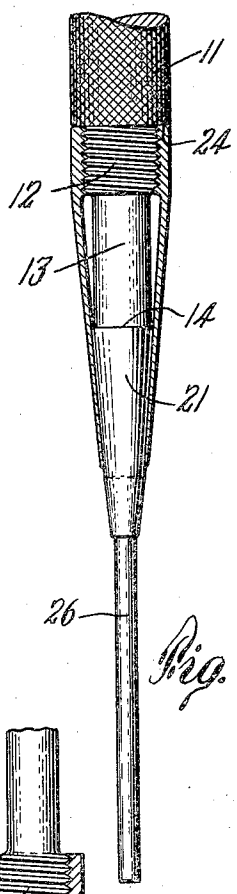


Fig. 4

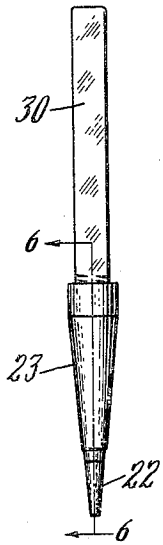


Fig. 5

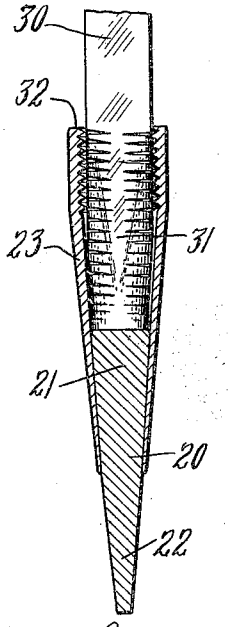


Fig. 6

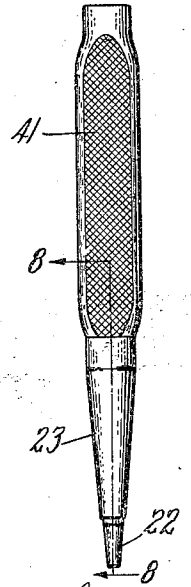


Fig. 7

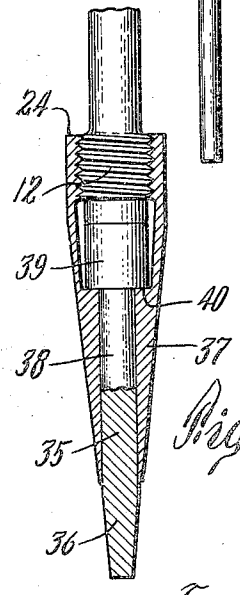


Fig. 8

Inventor:
Milton F. Powers.
by Wright, Brown, Quinby & May
Attys.

Patented Mar. 29, 1932 1,851,112

# UNITED STATES PATENT OFFICE

MILTON F. POWERS, OF WINCHESTER, MASSACHUSETTS

## HAND TOOL

Application filed November 17, 1930. Serial No. 496,070.

This application is a continuation in part of my application Serial No. 107,047 filed May 6, 1926. The invention relates to hand impact tools such as nail sets and the like which are adapted to be held in one hand and struck by a hammer or equivalent tool held in the other hand of the operator. The nail set ordinarily used by carpenters for various purposes is customarily made in a single piece, which consists of an elongated grip portion, usually cylindrical, tapering at its lower end to a cup-shaped terminal of small diameter suitable for engaging the head of a nail to set it below the surface of the wood. Among the customary uses to which nail sets are put, are the setting of nails with their heads below the surface of the wood, the driving of nail heads through boards or planks into which the nails have been driven for the purpose of releasing the plank from the "hold" of the nail, the prying up of double pointed tacks or brads, the making of holes for the starting of wood screws or for other purposes, insertion through screw-eyes to act as a lever in screwing the eyes into wood, adjusting the tension of door springs, determining the bores for lock spindles, and many other similar uses. These varied uses of nail sets result in rough usage and considerable stresses, both longitudinal and bending. In order to sink a nail deeply into wood, it is necessary that a considerable portion of the length of the nail set be capable of following the nail into the wood. For this reason, the lower portion of the nail set, varying usually between one-quarter and one-half of the entire length of the tool, is tapered with a substantially uniform angle of taper of approximately 10° to 15° and without any projecting shoulders to catch on the wood, so that the surface of this tapered portion has a substantially continuous taper throughout its length. This is an important feature of the tool since it facilitates the removal of the tool from wood into which it has been driven. Furthermore, when the nail set is driven under a double pointed brad to remove the brad from the wood, the uniformly tapered surface bears evenly on the surface of the wood and thus avoids the possibility of bending the lower portion of the tapered end.

One serious draw back to the one-piece nail set is the liability of the tool to become worn or injured at the work-engaging end. If the work-engaging point is broken or otherwise injured, the entire tool must be replaced. According to the present invention, I provide a nail set which is equipped with a replaceable work-engaging tip, this being accomplished without sacrificing any of the necessary and desirable characteristics of the one-piece nail set. My improved nail set is of rugged construction and capable of withstanding the hard usage to which a nail set is ordinarily subjected. The removable tip is rigidly held in place without sacrificing the continuous uniform taper of the lower portion of the tool as a whole, and without departing from the customary angularity of such taper.

A further advantage inherent in my improved tool lies in the ability of the operator to exchange the nail set terminal element for a prick punch terminal, a pin punch terminal, or any other similar work-engaging member.

The improved tool may consist essentially of three separate pieces, a grip portion, a terminal work-engaging element, and a sleeve holding these two members in end to end abutting relation. According to the invention, the terminal element is partly within the sleeve and partly projecting from the lower end thereof, the exposed surfaces on the sleeve and element being preferably formed so as to produce a substantially continuous uniform taper of standard angularity. I may secure the sleeve detachably to the grip member by any convenient means such as a screw thread. The large majority of carpenters are accustomed to hold a nail set in their left hand in order to strike it with a hammer held in the right hand. The grip portion of the nail set is held between the thumb and fore finger, the middle finger of the left hand resting against the lower tapered portion of the nail set. When using a nail set, the tendency of the middle finger of the left hand is to press tangentially on the tapered portion of the nail set so as to tend to rotate

this portion with respect to the grip portion. If the sleeve of my tool were attached to the grip portion with a right hand thread, this pressure of the middle finger of the operator on the sleeve would tend to unscrew it, hence I prefer to attach the sleeve to the grip portion with a left hand thread so that the tangential pressure of the middle finger of the left hand will tend to set up the sleeve tighter on the grip portion.

Other advantageous features will be apparent to one skilled in the art from the disclosure of the invention in the description which follows and the illustrations thereof on the drawings, of which,—

Figure 1 is an elevation of a nail set embodying the invention.

Figure 2 is a fragmentary elevation of the same, drawn to a larger scale, the sleeve being shown in a section taken on the line 2—2 of Figure 1.

Figure 3 is similar to Figure 2 but shows a prick punch terminal element in place of a nail set terminal element.

Figure 4 is similar to Figure 2 except that a pin punch is therein illustrated.

Figure 5 is an elevation of a nail set having a different form of grip member.

Figure 6 is a fragmentary elevation of the nail set shown in Figure 5, the sleeve and terminal element being shown in a section taken on the line 6—6 of Figure 5.

Figure 7 is an elevation of another nail set embodying a slightly modified form of the invention.

Figure 8 is a fragmentary view of the nail set shown in Figure 7, the sleeve and a portion of the terminal element being shown in section on the line 8—8 of Figure 7.

The nail set illustrated in Figure 1 comprises a grip portion 10 which is substantially cylindrical in shape and may have a knurled band 11 suitably positioned to be gripped by the thumb and fore finger. The lower end of the grip member 10 may be reduced, this lower portion having a threaded portion 12 and a reduced cylindrical portion 13 terminating in a flat end face 14. A terminal element 20 abuts the face 14 in end to end engagement so that an ample interfacial contact between the grip member and the terminal element is thus provided to transmit the force of blows on the end of the nail set to the work-engaging extremity. The terminal member 20 may be made with an upper tapering portion 21 and a lower portion 22 which is more steeply tapered. The upper portion 21 is adapted to seat within the inside of a sleeve 23, the upper end portion of which is adapted for threaded engagement with the portion 12 of the grip member. As shown, the wall of the sleeve 23 may taper downwardly in thickness, the inner surface of the lower portion of the sleeve having a taper fitted by the upper portion 21 of the terminal element. The exterior surface of the sleeve 23 is preferably tapered similarly to the lower portion 22 of the terminal element so that the sleeve and the projecting portion of the terminal element present a substantially continuous and uniformly conical exposed surface which extends for a substantial fraction of the entire length of the nail set. As shown in Figure 2, the threaded portion 12 of the grip member is reduced in diameter, forming a shoulder 24 at the lower extremity of the knurled portion 11 against which the upper end of the sleeve 23 may be screwed. As shown, the outer diameter of this upper end of the sleeve is substantially equal to the diameter of the knurled portion 11 of the grip member so that there is a substantially continuous unbroken exterior surface of the tool as this point.

As shown in Figure 3, the nail set terminal element 20 may be replaced by a prick punch element 25 or, as shown in Figure 4, by a pin punch terminal element 26. The nail set illustrated in Figures 5 and 6 is substantially identical with that illustrated in Figures 1 and 2 except for the shape of the grip member. The grip member 30 illustrated in Figure 5 may have a square cross section, this being preferred by some carpenters; the lower portion of this grip may be tapered as at 31 and threaded to receive the sleeve 23. This structure leaves a shoulder 32 at the upper end of the sleeve. This shoulder, however, does not interfere with the utility of the tool and is unobjectionable to those who prefer a square grip member.

Figures 7 and 8 illustrate a modified form of the invention. As therein shown, a terminal element 35 is provided, this element having a tapered lower portion 36 adapted to project below the lower end of the sleeve 37. The portion of the terminal element within the sleeve is cylindrical as at 38, a head or button 39 being provided at its upper end to seat on an internal shoulder 40 of the sleeve 37. The sleeve 37 is shaped inside to receive the terminal element 35 and to hold this element tightly in end to end engagement with the lower end of the grip portion 41. The grip member may be of any desired shape. By way of variety, a flattened grip member is illustrated, the flattened faces being knurled, if desired.

These nail sets are thus capable of hard usage, the work-engaging tips, which are the portions of the nail set which are first to be broken or worn, can be easily and quickly replaced with relatively small expense, and these results are obtained without sacrificing the continuous conical surface of the lower portion of the nail set which must extend over a very substantial fraction of the entire length of the nail set if the tool is to be capable of the uses to which the ordinary nail set is customarily put.

I claim:

1. A nail-set or the like having a work-engaging terminal element with a tapered lower portion, an elongated grip member, and means for removably holding said terminal element in fixed relation to said grip member, said means engaging the upper portion of the terminal element and having an outer surface forming with the lower portion of the terminal element a substantially continuous conical surface having the length and degree of taper of the tapered portion of an ordinary nail-set.

2. A nail-set or the like comprising an elongated solid grip member to be gripped by digits of a hand, said grip member having a contact face at its lower end, a sleeve detachably mounted on the lower portion of said grip member and projecting therebelow, and a terminal member having a contact face at its upper end and a work-engaging portion at its lower end, the upper end portion of said terminal member being normally engaged by said sleeve so that the two contact faces are held together in abutting engagement, the lateral surfaces of said sleeve and of the lower end portion of said terminal member forming a substantially continuous conical surface with a length and degree of taper similar to that of the tapered portion of an ordinary nail set.

3. A nail-set or the like comprising an elongated grip member to be grasped by the thumb and some of the fingers of an operator's left hand, said member having its lower end portion threaded with a left hand screw thread, a sleeve in threaded engagement with said threaded portion and projecting below the end of said member where it is normally pressed when in use by a finger of said operator's hand so that the manipulation of said tool tends to oppose unscrewing of said sleeve, and a terminal member having an upper portion held within said sleeve in abutting end to end contact with said grip member, and a lower work-engaging portion projecting from said sleeve, the exposed surfaces of said sleeve and terminal member forming a substantially continuous conical surface having the length and degree of taper of the tapered portion of an ordinary nail-set.

In testimony whereof I have affixed my signature.

MILTON F. POWERS.